

A2 CC1 Q3 T1 Review Key

$$\begin{array}{r}
 2x+1 \\
 3x-5 \overline{) 6x^2-7x-5} \\
 \underline{-(6x^2-10x)} \downarrow \\
 3x-5 \\
 \underline{-(3x-5)} \\
 0
 \end{array}$$

$$2x+1 + \frac{0}{3x-5}$$

$$\begin{array}{l}
 3x^2+5x^3+1 \\
 5x^3+3x^2+0x+1
 \end{array}
 \quad
 \begin{array}{l}
 b) \quad x+2=0 \\
 x=-2
 \end{array}$$

$$\begin{array}{r|rrrr}
 -2 & 5 & 3 & 0 & 1 \\
 & & -10 & 14 & -28 \\
 \hline
 & 5 & -7 & 14 & (-27)
 \end{array}$$

$$5x^2-7x+14 + \frac{-27}{x+2}$$

$$\begin{array}{l}
 c) \quad x-3=0 \\
 x=3
 \end{array}$$

$$\begin{array}{r|rrr}
 3 & 7 & -23 & 6 \\
 & & 21 & -6 \\
 \hline
 & 7 & -2 & 0
 \end{array}$$

$$7x-2 + \frac{0}{x-3}$$

$$\begin{array}{l}
 x^4-5x+10 \\
 x^4+0x^3+0x^2-5x+10
 \end{array}
 \quad
 \begin{array}{l}
 d) \quad x+3=0 \\
 \quad \quad -3-3 \\
 \hline
 \quad \quad x=-3
 \end{array}$$

$$\begin{array}{r|rrrrr}
 -3 & 1 & 0 & 0 & -5 & 10 \\
 & & -3 & 9 & -27 & 96 \\
 \hline
 & 1 & -3 & 9 & -32 & (106)
 \end{array}$$

$$x^3-3x^2+9x-32 + \frac{106}{x+3}$$

2) $x-2=0$
 $x=2$

$$\begin{array}{r|rrrr} 2 & 1 & -3 & -10 & 24 \\ & & 2 & -2 & -24 \\ \hline & 1 & -1 & -12 & 0 \end{array}$$

← Remainder is 0
therefore $(x-2)$
is a factor

Factor $\rightarrow x^2 - 1x - 12$

$$(x-4)(x+3)$$

3) $x-1=0$
 $x=1$

Plug in 1 $3(1)^{107} + 14(1)^{35} - 16(1)$
 $3 + 14 - 16$

$$1$$

4) $x+2=0$
 $x=-2$

$$14(-2)^{10} - 2(-2)^3 - 17$$

$$14336 - 2(-8) - 17$$

$$14336 + 16 - 17 = 14335$$

5) $x+3=0$
 $x=-3$

$$f(-3) = (-3)^3 + (-3)^2 - 5(-3) + 3$$

$$= 0 \text{ Therefore it is a factor } \boxed{\text{Yes}}$$

6) $x+1=0$
 $x=-1$

$$f(-1) = (-1)^3 - 13(-1)^2 + 23(-1) - 11$$

$$= -1 - 13 - 23 - 11$$

$$= -48 \text{ Therefore Not a factor } \boxed{\text{No}}$$

7) $x+16=0$
 $x = \boxed{-16}$

8) $2x-3=0$
 $+3 \quad +3$

$$\frac{2x}{2} = \frac{3}{2}$$

$$x = \boxed{\frac{3}{2}}$$

9) $f(x) = (x-3)(2x-1)(3+x)$

$$\begin{array}{lll} x-3=0 & 2x-1=0 & 3+x=0 \\ x=3 & 2x=1 & x=-3 \end{array}$$

$$x = \frac{1}{2}$$

$$\boxed{-3, \frac{1}{2}, 3}$$

$$10) f(8)=0$$

$$x=8$$

$$\text{Factor is } \boxed{(x-8)}$$

$$11) f\left(\frac{3}{2}\right)=0$$

$$x=\frac{3}{2}$$

$$\left(x-\frac{3}{2}\right) \text{ or } \boxed{(2x-3)}$$

$$12) f(x) = x^3 + 2x^2 - 8x$$

$$x(x^2 + 2x - 8)$$

$$\boxed{x(x+4)(x-2)}$$

$$13) p(x) = x^3 - 5x^2 - 4x + 20$$

$$x^2(x-5) \mid -4(x-5)$$

$$(x-5)(x^2-4)$$

$$\boxed{(x-5)(x+2)(x-2)}$$

$$14) p(x) = x^3 - 2x^2 + 4x - 8$$

$$x^2(x-2) \mid 4(x-2)$$

$$\boxed{(x-2)(x^2+4)}$$

$$15) p(x) = 2x^5 - 28x^3 - 64x$$

$$2x(x^4 - 14x^2 - 32)$$

$$2x(x^2-16)(x^2+2)$$

$$\boxed{2x(x+4)(x-4)(x^2+2)}$$

$$16) f(x) = 3x^3 + 11x^2 + 5x - 3$$

$$\begin{array}{r|rrrr} -1 & 3 & 11 & 5 & -3 \\ & & -3 & -8 & 3 \end{array}$$

$$3x^2 + 8x - 3 \quad \textcircled{0}$$

$$x = -3, \frac{1}{3}, 1$$

$$(x-1)(3x^2 + 8x - 3)$$

$$x = 1 \quad x = \frac{-8 \pm \sqrt{8^2 - 4(3)(-3)}}{2(3)}$$

$$x = \frac{-8 \pm \sqrt{100}}{6} = \frac{-8 \pm 10}{6}$$

$$x = \frac{-8+10}{6} = \frac{2}{6} = \frac{1}{3}$$

$$x = \frac{-8-10}{6} = \frac{-18}{6} = -3$$

$$17) f(x) = (x^2 + 3x + 5)(2x + 3)$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(5)}}{2} \quad 2x + 3 = 0$$

$$\frac{2x}{2} = \frac{-3}{2}$$

$$x = \frac{-3 \pm \sqrt{-11}}{2}$$

$$x = -\frac{3}{2}$$

$$18) f(x) = 2x^5 - 28x^3 - 64x$$

$$2x(x^4 - 14x^2 - 32)$$

$$2x(x^2 - 16)(x^2 + 2)$$

$$2x(x+4)(x-4)(x^2+2)$$

$$2x=0 \quad x=-4 \quad x=4 \quad x^2+2=0$$

$$x=0$$

$$x^2 = -2$$

$$x = -4, 0, 4, \pm\sqrt{-2} \quad x = \pm\sqrt{-2}$$

$$19) \text{ zeros: } -1, -2, -3$$

$$\text{factors: } (x+1)(x+2)(x+3)$$

$$1 = (x+1)(x+2)(x+3)$$

20) Zeros @ $-5, 0, 3$

↑
Double zero
b/c it "bounces"

$$y = -(x+5)(x)^2(x-3)$$

3

21) Zeros: $-2, 4, 10$

$$(x+2)(x-4)(x-10)$$

$$y = a(x+2)(x-4)(x-10)$$

$$192 = a(6+2)(6-4)(6-10)$$

$$192 = a(8)(2)(-4)$$

$$\frac{192}{-64} = \frac{-64a}{-64}$$

$$-3 = a$$

$$y = -3(x+2)(x-4)(x-10)$$

22) $y = x^3 - 10x^2 + 11x + 70$

Plug in and look at the table of values
to find where $y = 0$. Happens @ $x = 7$

Therefore $(x-7)$ is the factor,

Choice 3

$$23) f(x) = x^3 - 5x^2 - 4x + 20$$

$$x^2(x-5) - 4(x-5)$$

$$(x^2 - 4)(x-5)$$

$$(x+2)(x-2)(x-5)$$

$$x = -2, 2, 5$$

a) x-intercepts @

$$(-2, 0) (2, 0) (5, 0)$$

b) The graph has 3 x-intercepts. The function "bounces" at one of them meaning it would be at least a "double" root. That would mean that the function has at least 4 zeros but the highest exponent of the equation is 3.

$$24) \text{ zeros: } -4, 6$$

↑

bounces
therefore
it's a
double root

$$y = a(x+4)^2(x-6)$$

$$36 = a(2+4)^2(2-6)$$

$$36 = a(36)(-4)$$

$$\frac{36}{-144} = \frac{-144a}{-144}$$

$$-\frac{1}{4} = a$$

$$y = -\frac{1}{4}(x+4)^2(x-6)$$

$$25) \quad x-5=0$$

$$x=5$$

$$\begin{array}{r|rrrr} 5 & 4 & -2 & 8 & 10 \\ & & 20 & 90 & 490 \\ \hline & 4 & 18 & 98 & \textcircled{500} \end{array}$$

$$4x^2 + 18x + 98 + \frac{500}{x-5}$$

a) $P(x) = 4x^2 + 18x + 98$

b) No $x-5$ is not a factor
because when we divide

$$\frac{4x^3 - 2x^2 + 8x + 10}{x-5} \quad \text{there is a remainder.}$$